



Thermal Ceramics

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MATERIAL SAFETY DATA SHEET

SECTION 1 - PRODUCT NAME

Material Name: Refractory Ceramic Fiber Product
Common name: RCF; Ceramic Fiber; Man-made Vitreous Fiber (MMVF)
Intended use: High temperature industrial thermal insulation
Trade names: Kaowool®: Cerafiber®: Cerawool®: Cerachem®: Uni-Bloc®: Saber-Bloc®: Pyro-Bloc®: Quad-Bloc™: Z-Blok®: Pyro-Fold®: Ultrafelt®: Pyro-Blanket®: Pyro-Log™: Cerablanket®: Blanket, Modules, Strips, Bulk, Packing, Insulation, Shapes

Manufacturer/Supplier

THERMAL CERAMICS INC.

P. O. BOX 923 DEPT. 300

AUGUSTA, GA 30903

Product Stewardship Program 800-722-5681

SECTION 2 - COMPOSITION AND INGREDIENTS

	CAS NUMBER:	PERCENT:	OSHA PEL:	OSHA PEL: (PROPOSED)	THERMAL CERAMICS
Refractory Ceramic Fiber (RCF)	1428-44-00-6	95-100	15 mg/m ³ (Total dust) 5 mg/m ³ (Respirable dust)	1 fiber/cc*	1 fiber/cc**

* OSHA proposed permissible exposure limit (PEL) in a *Notice of Proposed Rulemaking, Federal Register* H.S. 1178. June 12, 1992.

** Thermal Ceramics' recommended exposure guideline (REG) for respirable fibers as an 8 hour time weighted average (TWA) exposure, based on air samples collected and analyzed using NIOSH method 7400(B). Use NIOSH method 0500 for total dust and method 0600 for respirable dust collection and analysis.

(NOTE: See Section 8 of this MSDS for Personal Protection Guidelines)

SECTION 3 - HAZARDS IDENTIFICATION

Medical conditions

which may be

aggravated by contact:

Dust and respirable fibers from this product may aggravate existing chronic lung conditions such as bronchitis, emphysema and asthma.

Target organs:

Eyes, skin, and respiratory system

Primary entry route:

Inhalation

Acute effects:

Upper respiratory physical irritation. Irritation and inflammation to the eyes on contact and to the skin on prolonged contact.

Chronic effects:

The International Agency for Research on Cancer (IARC), part of the World Health Organization (WHO), has classified RCF, along with fibrous glasswool and mineral wool as possible human carcinogens (Group 2B) based on sufficient evidence of carcinogenicity in animals but insufficient data in humans. Additionally, IARC classified crystalline silica, which may be found in after-service RCF exposed to temperatures above 1800°F. as probably carcinogenic to humans (Group 2A).

**Signs and symptoms
of overexposure:**

Eye contact:

Physical irritation - inflammation

Skin contact:

Physical irritation - rash

Ingestion:

May cause temporary irritation to the gastro-intestinal tract

Inhalation:

Irritation or soreness in throat, nose and respiratory tract

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SECTION 4 - FIRST AID

Eye contact: Flush with large amounts of water for at least 15 minutes. Do not rub eyes.
Skin contact: Wash affected area gently with soap and water. Skin cream or lotion after washing may be helpful.
Ingestion: Do not induce vomiting, drink plenty of water.
Inhalation: Remove to clean fresh air.

****If any of the symptoms persist, seek medical attention immediately****

SECTION 5 - FIRE FIGHTING MEASURES

Flash point: Non-combustible
Extinguishing media: Use extinguishing media appropriate to the surrounding fire.
Explosion hazards: None
Fire fighting protective equipment: Wear full bunker gear including positive pressure self-contained breathing apparatus.

SECTION 6 - ACCIDENTAL RELEASE MEASURES

Spill/leak procedures: Avoid creating dust. Follow routine housekeeping procedures. Vacuum only with HEPA filtered equipment. If sweeping is necessary use a dust suppressant and place material in containers. Do not use compressed air. Personnel should wear gloves, goggles and approved respirator. Avoid clean-up procedures that could result in water pollution.

SECTION 7 - HANDLING AND STORAGE

This product is stable under all conditions of storage. Store in original factory container in a dry area. Keep container closed when not in use. Follow all MSDS/label precautions.

SECTION 8 - EXPOSURE CONTROLS/PERSONAL PROTECTION

Engineering controls: Use engineering controls such as ventilation and dust collection devices to reduce airborne fiber concentrations to the lowest attainable level.

Protective clothing: Protective gloves, long sleeved shirts and pants are recommended. Wash exposed clothing separately from other clothing and rinse washer thoroughly. Vacuum work clothing with HEPA filtered vacuum before removing from the work area.

Eye protection: Goggles/safety glasses with sideshields should be worn.

Respiratory protection: When it is not possible or feasible to reduce airborne fiber and/or cristobalite dust levels below the PEL or REG through engineering controls, or until they are installed, employees are encouraged to use good work practices together with respiratory protection. Before providing respirators to employees (especially negative pressure type), employers should 1) monitor for airborne fibers and respirable cristobalite concentrations using NIOSH method 7400(B) and 7500 respectively and select the appropriate respiratory protection based upon the results of that monitoring, 2) have the workers evaluated by a physician to determine the workers' ability to wear respirators, and 3) implement respiratory protection training programs.

Use NIOSH/MSHA approved respirators, in compliance with OSHA Respiratory Protection Standard 29 CFR 1910.134 and 29 CFR 1926.103, for the particular hazard or airborne concentrations to be encountered in the work environment.

MATERIAL SAFETY DATA SHEET**SECTION 8 - CONTINUED****Minimum Acceptable Respiratory Type
When Handling RCF Products****AS-PRODUCED OR "VIRGIN" FIBERS**

<u>CONCENTRATION*</u>	<u>RESPIRATOR</u>
Up to 1 fiber/cc	OPTIONAL: Disposable dust/mist respirator (e.g. 3M 9900)
1 - 5 fibers/cc	Half-face, air-purifying respirator equipped with high efficiency particulate air (HEPA) filter cartridges (e.g. 3M 6000 Series)
5-25 fibers/cc	Full-face air-purifying respirator with high efficiency particulate air (HEPA) filter cartridges (e.g. 3M 7800 with 7255 filters) or powered air-purifying respirator (PAPR) equipped with HEPA filter cartridges (e.g. 3M W3265S with W3267 filters)
Greater than 25 fibers/cc	Full-face positive pressure supplied air respirator (e.g. 3M 7800 with W9435 hose and W3196 regulator)

AFTER-SERVICE FIBERS/CRISTOBALITE

<u>CONCENTRATION*</u>	<u>RESPIRATOR</u>
Up to 5 fibers/cc or Up to 0.5 mg/m ³ respirable cristobalite	Half-face, air-purifying respirator with high-efficiency particulate air (HEPA) filter cartridges (e.g. 3M 6000 Series)
5-25 fibers/cc or 0.5 - 2.5 mg/m ³ respirable cristobalite	Full-face air-purifying respirator equipped with high-efficiency particulate air (HEPA) filter cartridges (e.g. 3M7800 with 7255 filters) or powered air-purifying respirator (PAPR) equipped with HEPA filter cartridges (e.g. 3M W3265S with W3267 filters)
Greater than: 25 fibers/cc 2.5 mg/m ³ respirable cristobalite	Full-face positive pressure supplied air respirator (e.g. 3M 7800 with W9435 hose and W3196 regulator)

* = Eight hour time weighted average (TWA) of concentrations determined by air samples collected and analyzed using NIOSH method 7400(B) for airborne fibers and method 7500 for cristobalite.

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

Appearance and odor:	White odorless wool-like material	Vapor pressure:	Not applicable
Boiling point:	Not applicable	Vapor density:	Not applicable
Melting point:	> 3200°F (1768° C)	Specific gravity range:	2.50 - 2.70
Water solubility (%):	Not soluble in water.	% Volatile by volume:	0
Chemical family:	Vitreous Aluminosilicate Fibers		

SECTION 10 - STABILITY AND REACTIVITY

Hazardous polymerization: Will not occur.
Chemical incompatibilities: Hydrofluoric acid, phosphoric acid, strong alkalis.
Hazardous decomposition products: None.

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SECTION 11 - TOXICOLOGICAL INFORMATION

Epidemiology:

Industry epidemiologic investigations of RCF production workers are ongoing.

The preliminary evidence, obtained from employees in RCF manufacturing facilities, is as follows:

- 1) There is no evidence of any fibrotic lung disease (interstitial fibrosis) whatsoever on x-ray.
- 2) There is no evidence of any lung disease among those employees exposed to RCF that have never smoked.
- 3) A statistical trend was observed in the exposed population between the duration of exposure to RCF and a decrease in some measures of pulmonary function. These observations are clinically insignificant. In other words, if these observations were made on an individual employee, the results would be interpreted as being within the normal range.
- 4) Pleural plaques (thickening along the chest wall) have been observed in a small number of employees who had a long duration of employment. There are several occupational and non-occupational causes for pleural plaque. It should be noted that plaques are not pre-cancer nor are they associated with any measurable effect on lung function.

Toxicology:

A number of studies on the health effects of inhalation exposure of rats and hamsters have been completed. In a lifetime nose-only inhalation study, rats exposed to the Maximum Tolerated Dose of 30 mg/m³ (200 fibers/cc) developed progressive lung damage (interstitial fibrosis) and cancers of the lung and of the pleura (lining of the chest wall and lung). In contrast, hamsters similarly exposed developed interstitial fibrosis and pleural cancer, but no lung cancer. Cancer of the pleura is called mesothelioma.

A multiple dose study in rats (3, 9, 16 mg/m³; approximately 25, 75, 115 fibers/cc, respectively) has been concluded after 29 months. These study data demonstrate a dose-response relationship to the biological effects of RCF in rats. There is no RCF related increase in lung tumors at 3, 9 or 16 mg/m³. A pleural fibrosis and mesothelioma were seen in a single rat in the mid-dose (9 mg/m³) group. In addition, no consistently diagnosed fibrosis was seen below 9 mg/m³. Pulmonary fibrosis was observed at 9 and 16 mg/m³.

The International Agency for Research on Cancer (IARC) reviewed the carcinogenicity data on man-made vitreous fibers (including ceramic fiber, glasswool, rockwool, and slagwool) in 1987. IARC classified ceramic fiber, fibrous glasswool and mineral wool (rockwool and slagwool) as possible human carcinogens (Group 2B). IARC's classification of ceramic fiber was based on sufficient evidence of carcinogenicity in experimental animals in the absence of data on the carcinogenicity of ceramic fibers to humans.

SECTION 12 - ECOLOGICAL INFORMATION

Adverse effects of this material on the environment are not anticipated.

SECTION 13 - DISPOSAL INFORMATION

Waste management/ disposal:

To prevent waste fibers becoming airborne, a cover or plastic bagging is recommended.

Comply with federal, state and local regulations. Method of disposal: Landfill (reportable quantities (RQ) not applicable). Chemical additions, processing or otherwise altering this material may make the waste management information presented in this MSDS incomplete, inaccurate, or otherwise inappropriate.

RCRA:

If discarded in its purchased form, this product would not be a hazardous waste either by listing or by characteristic. However, under RCRA, it is the responsibility of the product user to determine at the time of disposal whether a material containing the product or derived from the product should be classified as a hazardous waste. (40 CFR 261.20-24).

TCLP:

As manufactured, refractory ceramic fiber blankets were tested using EPA's Toxicity Characteristics Leaching Procedure (TCLP). Results showed there were no detectable contaminants or detectable leachable contaminants which exceeded the regulatory levels.

MATERIAL SAFETY DATA SHEET**SECTION 14 - TRANSPORT INFORMATION****Department of Transportation (D.O.T.):**

Hazard class: Not regulated.
Labels: Not applicable.
Placards: Not applicable.
Bill of lading: Product name.

United Nations (UN) Number: Not applicable.
North America (NA) Number: Not applicable.

SECTION 15 - REGULATORY INFORMATION

SARA Title III: This product does not contain any substances reportable under Sections 302, 304, 313 (40 CFR 372).
OSHA: Comply with Hazard Communication Standard 29 CFR 1910.1200 and 29 CFR 1926.59, Respiratory Protection Standard 29 CFR 1910.134.
TSCA Inventory: All substances contained in this product are listed in the TSCA Chemical Inventory.
California: Listed as "Ceramic Fibers (airborne particles of respirable size)" Proposition 65, The Safe Drinking Water and Toxic Enforcement Act of 1986.

SECTION 16 - OTHER INFORMATION

Precautions To Be Taken After Service and Upon Removal: As manufactured, RCF products are aluminosilicates which may transform upon heating at temperatures above 1800°F to mullite and cristobalite (a form of crystalline silica). Removal of RCF products after service may generate respirable dust. Prolonged/repeated inhalation of respirable free crystalline silica dust may cause delayed lung injury (silicosis). IARC has placed crystalline silica in Category 2A (IARC believes there is sufficient evidence of carcinogenicity in animals but evidence of the carcinogenicity to humans is limited). The OSHA PEL for respirable cristobalite is 0.0 mg/m³. Appropriate ventilation and respiratory protection should be provided in compliance with OSHA Standards 29 CFR 1910.94 and 29 CFR 1926.57 and 1910.134 and CFR 1926.103, respectively.

Definitions:

ACGIH: American Conference of Governmental Industrial Hygienists
CAS#: Chemical Abstracts Service Number
EPA: Environmental Protection Agency
f/cc: Fibers per cubic centimeter
HEPA: High Efficiency Particulate Air
mg/m³: Milligrams per cubic meter of air
MSHA: Mine Safety and Health Administration
NIOSH: National Institute for Occupational Safety and Health
OSHA: Occupational Safety and Health Administration
RCRA: Resource Conservation & Recovery Act
SARA: Superfund Amendments and Reauthorization Act
TITLE III: Emergency Planning and Community Right To Know Act
Section 302: Extremely Hazardous Substances
Section 304: Emergency Release
Section 313: Toxic Chemicals
TCLP: Toxicity Characteristics Leaching Procedures (EPA)
TLV: Threshold Limit Values (ACGIH)
TSCA: Toxic Substance Control Act
29 CFR 1910.134 and 29 CFR 1926.103: OSHA Respiratory Protection Standard
29 CFR 1910.1200 and 29 CFR 1926.59: OSHA Hazard Communications Standard

MATERIAL SAFETY DATA SHEET**SECTION 16 - CONTINUED**

Label:

Sample

**PRODUCT SAFETY INFORMATION
REFRACTORY CERAMIC FIBER PRODUCT**

WARNING: This product contains a substance which has been identified by the International Agency for Research on Cancer (IARC) as possibly carcinogenic to humans.

Avoid breathing fiber particulates and dust.

RISKS:

- Possible cancer hazard by inhalation.
- Cristobalite (crystalline silica) formed at high temperatures (above 1800°F) is classified by IARC as a probable human carcinogen.
- May cause temporary irritation to eyes, skin and respiratory tract.

PRECAUTIONARY MEASURES:

- Minimize airborne fibers with engineering controls.
- Wear a NIOSH/MSHA approved respirator.
- Wear long sleeved loose-fitting clothing, eye protection, gloves.
- Wash work clothing separately and rinse washing machine after use.

FIRST AID MEASURES:

Eyes: flush with water. **Skin:** wash with soap and warm water. **Ingestion:** do not induce vomiting. Get medical attention if gastrointestinal symptoms develop. **Inhalation:** remove to fresh clean air.

If any of the above irritations persists seek medical attention immediately.

**FOR ADDITIONAL PRODUCT INFORMATION AND WORK PRACTICES
REFER TO THE MATERIAL SAFETY DATA SHEET (MSDS).**

THERMAL CERAMICS

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**RENSEIGNEMENTS SUR LA
SÉCURITÉ DES PRODUITS
PRODUIT DE FIBRE CÉRAMIQUE RÉFRACTAIRE**

ATTENTION: Ce produit contient de une substance identifiée par le Centre International de Recherche sur le Cancer (IARC) comme étant possiblement cancérogène pour l'humain.

Évitez de respirer les particules de fibre et la poussière.

RISQUES:

- Risques possibles de cancer si inhalé.
- La cristobalite (silice cristalline) formée à haute température (plus de 1800°F) est classée par le IARC comme étant probablement cancérogène pour l'humain.
- Peut causer une irritation temporaire des yeux, de la peau et des voies respiratoires.

MESURES PREVENTIVES:

- Minimisez les fibres en suspension dans l'air par des mécanismes techniques.
- Portez un respirateur approuvé par MSHA/NIOSH.
- Portez des vêtements amples à manches longues, une protection oculaire et gants.
- Lavez les vêtements de travail séparément et rincez la machine après chaque utilisation.

PREMIERS SOINS:

Yeux: rincez abondamment avec de l'eau. **Peau:** lavez avec du savon et de l'eau tiède. **Ingestion:** ne pas faire vomir. Consultez un médecin si des symptômes gastrointestinaux se revient. **Inhalation:** déplacez la personne à l'air propre et frais.

Si quelconque des irritations mentionnées précédemment persistent, consultez un médecin immédiatement.

POUR RENSEIGNEMENTS SUPPLÉMENTAIRES SUR LE PRODUIT ET PRATIQUES DE TRAVAIL VOIR LA FICHE SIGNALÉTIQUE (FS).

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